CLAIMS

1. A circuit for adjusting the duty cycle of a PWM signal, comprising:

a battery current control section generating a current control signal proportional to an amount a battery charging current exceeds a predetermined battery charging current threshold; a battery voltage control section generating a voltage control signal proportional to an amount a battery voltage exceeds a predetermined battery voltage threshold; a compensation capacitor and a current source charging said compensation capacitor; and a comparator generating a PWM signal based on the amplitude of the voltage on said compensation capacitor; said current source and said current control signal and voltage control signal summed together at a common node, said current control signal and/or said voltage control signal reducing the voltage on said compensation capacitor thereby reducing the duty cycle of said PWM signal.

2. A circuit as claimed in claim 1, further comprising a power control section generating a power control signal proportional to an amount of total current that is required by an active system and a battery charger; said current source and said current control signal and voltage control signal and said power control signal summed together at said common node, said current control signal and/or said voltage control signal and/or said power control signal reducing the voltage on said compensation capacitor thereby reducing the duty cycle of said PWM signal.

3. A circuit as claimed in claim 2, wherein said power control section comprises a sense amplifier for sensing the total current generated by said source and generating a signal indicative of said total current generated by DC source, and a transconductance

amplifier comparing said signal indicative of said total current generated by said source with a predetermined power threshold signal.

4. A circuit as claimed in claim 3, wherein said power control signal has a nonzero value if said signal indicative of said total current generated by said source exceeds said power threshold signal.

5. A circuit as claimed in claim 1, wherein said current control section comprises a sense amplifier for sensing charging current supplied to said battery and generating a signal indicative of charging current supplied to said battery, and a transconductance amplifier comparing said signal indicative of charging current supplied with a predetermined charging current signal and generating said current control signal.

6. A circuit as claimed in claim 5, wherein said current control signal has a nonzero value if said signal indicative of charging current supplied to said battery exceeds said predetermined charging current signal.

7. A circuit as claimed in claim 1, wherein said voltage control section comprises a summing block generating a predetermined battery voltage signal, and a transconductance amplifier comparing said signal indicative of battery voltage with said predetermined signal and generating said voltage control signal.

8. A circuit as claimed in claim 7, wherein said summing block having a first input signal comprising a reference voltage signal, said reference signal being selected in accordance with a threshold voltage for said battery, a second input signal comprising a battery voltage setting signal, said battery voltage setting signal being generated by said battery, and a third input signal comprising a voltage correction signal, said voltage correction signal compensating for parasitic capacitance of said battery, wherein said

summing block providing a weighted sum of said first, second and third input signals to generate said battery voltage threshold signal.

9. A circuit as claimed in claim 1, further comprising an oscillator generating a fixed frequency sawtooth signal, said comparator comparing said sawtooth signal and said amplitude of the charge on said charge capacitor and generating said PWM signal having a duty cycle adjusted by said amplitude of the charge on said charge capacitor.

10. A circuit as claimed in claim 1, further comprising a Buck DC/DC converter circuit coupled to a plurality of switches and a DC power source, said PWM signal controlling the conduction states of said switches to control the duty cycle of said Buck converter to adjust the amount of charging current delivered to said battery from said DC power source.

11. A circuit as claimed in claim 5, wherein said sense amplifier comprising an operational amplifier coupled in parallel to a sense resistor, said operational amplifier sensing the current through a sense resistor, said current through said sense resistor indicative of said current supplied to said battery; a switch coupled between one input of said operational amplifier and ground, the conduction state of said switch being controlled by the output of said operational amplifier; and first and second gain resistors placed between said sense resistor and said one input of said operational amplifier, and between said switch and a reference node, respectively; wherein said signal indicative said charging current supplied to said battery being taken from a node between said second resistor and said switch.

12. A circuit as claimed in claim 2, wherein said active system comprising a portable computer.

13. A circuit as claimed in claim 3, wherein said DC source comprises an AC/DC adapter.

14. A battery charging circuit, comprising:

a current control circuit generating a current control signal proportional to the amount battery charging current exceeds a predetermined battery charging current threshold;

a voltage control circuit generating a voltage control signal to the amount battery voltage exceeds a predetermined battery voltage threshold;

a DC/DC converter circuit generating said battery charging current from a DC source;

a PWM signal generator circuit generating a PWM signal for controlling the duty cycle of said DC/DC converter circuit, said PWM circuit comprising a comparator, an oscillator, a compensation capacitor and a current source charging said compensation capacitor;

said comparator generating said PWM signal based on the voltage on said compensation capacitor; said current source and said current control signal and voltage control signal summed together at a common node, said current control signal and/or said voltage control signal reducing the voltage on said compensation capacitor thereby reducing the duty cycle of said PWM signal and thereby reducing the current delivered by said DC/DC converter circuit.

15. A circuit as claimed in claim 14, further comprising a power control section generating a power control signal proportional to an amount of total current that is required by an active system and a battery charger; said current source and said current control signal and voltage control signal and said power control signal summed together at said common node, said current control signal and/or said voltage control signal and/or said power control signal reducing the voltage on said compensation capacitor thereby reducing the duty cycle of said PWM signal.

16. A circuit as claimed in claim 15, wherein said power control section comprises a sense amplifier for sensing the total current generated by said source and generating a signal indicative of said total current generated by DC source, and a transconductance amplifier comparing said signal indicative of said total current generated by said source with a predetermined power threshold signal.

17. A circuit as claimed in claim 16, wherein said power control signal has a nonzero value if said signal indicative of said total current generated by said source exceeds said power threshold signal.

18. A circuit as claimed in claim 14, wherein said current control section comprises a sense amplifier for sensing charging current supplied to said battery and generating a signal indicative of charging current supplied to said battery, and a transconductance amplifier comparing said signal indicative of charging current supplied with a predetermined charging current signal and generating said current control signal.

19. A circuit as claimed in claim 18, wherein said current control signal has a nonzero value if said signal indicative of charging current supplied to said battery exceeds said predetermined charging current signal.

20. A circuit as claimed in claim 14, wherein said voltage control section comprises a summing block generating a predetermined battery voltage signal, and a transconductance amplifier comparing said signal indicative of battery voltage with said predetermined signal and generating said voltage control signal.

21. A circuit as claimed in claim 20, wherein said summing block having a first input signal comprising a reference voltage signal, said reference signal being selected in accordance with a threshold voltage for said battery, a second input signal comprising a battery voltage setting signal, said battery voltage setting signal being generated by said battery, and a third input signal comprising a voltage correction signal, said voltage correction signal compensating for parasitic capacitance of said battery, wherein said summing block providing a weighted sum of said first, second and third input signals to generate said battery voltage threshold signal.

22. A circuit as claimed in claim 14, further comprising an oscillator generating a fixed frequency sawtooth signal, said comparator comparing said sawtooth signal and said amplitude of the charge on said charge capacitor and generating said PWM signal having a duty cycle adjusted by said amplitude of the charge on said charge capacitor.

23. A circuit as claimed in claim 14, wherein said DC/DC converter circuit comprises a Buck DC/DC converter circuit coupled to a plurality of switches and a DC power source, said PWM signal controlling the conduction states of said switches to control the duty cycle of said Buck converter to adjust the amount of charging current delivered to said battery from said DC power source.

24. A circuit as claimed in claim 18, wherein said sense amplifier comprising an operational amplifier coupled in parallel to a sense resistor, said operational amplifier

sensing the current through a sense resistor, said current through said sense resistor indicative of said current supplied to said battery; a switch coupled between one input of said operational amplifier and ground, the conduction state of said switch being controlled by the output of said operational amplifier; and first and second gain resistors placed between said sense resistor and said one input of said operational amplifier, and between said switch and a reference node, respectively; wherein said signal indicative said charging current supplied to said battery being taken from a node between said second resistor and said switch.

25. A circuit as claimed in claim 18, wherein said circuit operates in voltage mode by placing said sense resistor in parallel with said DC/DC converter for sensing said charging current supplied to said battery.

26. A circuit as claimed in claim 14, wherein said DC/DC converter circuit comprises a Buck converter comprising an inductor in parallel with a capacitor.

27. A circuit as claimed in claim 15, wherein said active system comprising a portable computer.

28. A circuit as claimed in claim 14, wherein said DC source comprises an AC/DC adapter.